

REMARKS

Claims 1-40 are pending in the application and are currently rejected. Claims 1, 2, 6, 7, 9, 12, 14, 19, 20, 30 and 36 have been amended. In light of the amendments and remarks herein, reconsideration of claims 1-40 is respectfully requested.

Amendments to the Specification

The Specification has been amended to address the Examiner's objections. No new matter has been added to the Specification.

Amendments to the Claims

While Applicants believe that the previously presented claims are patentable over all of the art cited in the Office Action as well as all other references submitted by Applicants, the claims have nonetheless been amended as follows in order to expedite the allowance of the claims. The amendments are, therefore, made without prejudice or disclaimer, and Applicants reserve the right to pursue the original scope of the claims as provided prior to the cancellation or amendments, such as through continuation practice.

Claim 1 is amended to claim an apparatus as recited in the dependent claims to resolve the Examiner's objection to the claims and to clarify that the radiation is selectively irradiated in multiple predetermined directions. Support for the amendment is found in the Application at paragraphs 080-085.

Claim 2 is amended to clarify the distinction between the radiation emitter(s) of claim 1 and the radiation emitter(s) of claim 2.

Claims 6, 7, 9, 12 and 19 are amended to provide antecedent basis for the term "the emitter."

Claim 14 is amended to clarify the direction of the bristles that is referred to in the claim.

Claim 20 is amended to correct the dependency of the claim, to resolve the issues addressed by the Examiner.

Claim 30 is amended to correct the reference to a light diffuser.

Claim 36 is amended to correct a typographical error.

As such, the amendments to claims 1, 6, 7, 9, 12, 14, 20, 30 and 36 do not add any new matter.

Double Patenting

The Examiner provisionally rejected Claims 1-9, 22-29, 31 and 35-40 of the present Application based on obviousness-type double patenting as being unpatentable over claims 1-7, 9-16, 21-26 of copending Application No. 10/777,020 (the "'020 Application").

The differences between Claim 1 in the present application and Claim 1 of the '020 Application are not obvious. Each claimed invention is different in kind and is, therefore, patentably distinct. For example, Claim 1 of the present application recites "a first radiation emitting element coupled to the body to selectively irradiate a plurality of regions of the oral cavity with phototherapeutic radiation along multiple predetermined directions." On the other hand, Claim 1 of the '020 Application, from which all other cited claims depend, recites "a body sized and shaped so as to fit at least partially in a user's mouth and adapted to conform to the shape of at least a portion of the oral cavity." These two Applications are directed to two independent inventions. The present Application claims a device capable of emitting radiation in multiple directions to, e.g., selectively direct optical radiation delivered from an oral appliance to different regions of the oral cavity depending on the desired treatment regimen. (See Application ¶ 080.)¹ On the other hand, the '020 Application as filed claims a device, e.g., such as a mouthpiece that is capable of fitting the portions of the oral cavity between the teeth and the walls of the oral cavity or other body portions such as a user's tongue, the roof of a user's mouth (hard and/or soft palate), and/or the floor of the oral cavity (for example, beneath a user's tongue). (See '020 Application ¶ 067.) Dependent claims 2-7, 9-16, 21-26 of the '020

¹ Unless specifically noted otherwise, any use of examples in this response is intended to be exemplary only and is not intended to limit the scope of any present claim or any claim that may issue from this application.

Application do not render Claim 1 in the present application obvious, because those claims also include the patentably distinct limitations of Claim 1 of the '020 Application.

Claims 2-9, 22-29, 31 and 35-40 of the present Application are patentably distinct for the same reasons that Claim 1 is patentably distinct.

The Examiner provisionally rejected Claims 1-7, 9-18, 21-28, 31-33 and 35-40 of the present Application based on obviousness-type double patenting as being unpatentable over claims 1, 3, 4, 9-13, 15-17, 20-22, 24-31, 38, 39 and 41-46 of copending U.S. Patent Application No. 10/777,022 (the "'022 Application").

The differences between Claim 1 in the present Application and Claim 1 of the '022 Application are not obvious. Each claimed invention is different in kind and is, therefore, patentably distinct. Claim 1 of the '022 Application, from which all other cited claims of the '022 Application depend, recites an apparatus having "at least one radiation emitter coupled to the body to irradiate a portion of the oral cavity with phototherapeutic radiation in *at least two separate spectral bands*." These two applications are directed to two distinct concepts that are not obvious in light of each other. As noted above, the present Application claims a device capable of emitting radiation in multiple directions to, e.g., selectively direct optical radiation delivered from an oral appliance to different regions of the oral cavity depending on the desired treatment regimen. (See '686 Application ¶ 080.) The '022 Application claims a device that is capable of irradiating tissue in the oral cavity using distinct spectral bands to, e.g., "treat the same conditions more effectively or to treat two different conditions." (See '022 Application ¶ 086.) Claims 3, 4, 9-13, 15-17, 20-22, 24-31, 38, 39 and 41-46 of the '022 Application also are not obvious because they incorporate the non-obvious limitations of Claim 1, which are patentably distinct over Claim 1 of the present Application.

Claims 2-7, 9-18, 21-28, 31-33 and 35-40 of the present Application, which depend on Claim 1, are patentably distinct for the same reasons that Claim 1 is patentably distinct.

The Examiner also provisionally rejected Claims 1-7, 9-18, 20-33 and 35-40 of the present Application based on obviousness-type double patenting as being unpatentable over

claims 1-4, 7-12, 14-33 and 35-39 of copending Application No. 10/776,687 (the “‘687 Application”).

The differences between Claim 1 in the present application and Claim 1 of the ‘687 Application are not obvious. Each claimed invention is different in kind and is, therefore, patentably distinct. Claim 1 of the ‘687 Application recites an “emitter being capable of delivering radiation to a region of facial tissue.” These two Applications are directed to two independent inventions. As noted above, the present Application claims a device capable of emitting radiation in multiple directions to, e.g., selectively direct optical radiation delivered from an oral appliance to different regions of the oral cavity depending on the desired treatment regimen. (See ‘686 Application ¶ 080.) On the other hand, the ‘687 Application as filed claims a device capable of emitting radiation to facial tissue from the oral cavity to, e.g., treat acne by directly radiating from within the oral cavity out toward the target tissue instead of treating acne by radiating the affected skin. (See ‘687 Application ¶ 0131.) Dependent claims 2-4, 7-12, 14-33 and 35-39 of the ‘687 Application do not render Claim 1 in the present application obvious, because those claims also include the patentably distinct limitations of Claim 1 of the ‘687 Application.

Claims 2-7, 9-18, 20-33 and 35-40 of the present Application are patentably distinct for the same reasons that Claim 1 is patentably distinct.

The Examiner also provisionally rejected Claims 1, 2, 4-7, 9-30 and 36-40 of the present Application based on obviousness-type double patenting as being unpatentable over claims 1, 2, 5-10 and 12-34 of copending Application No. 10/776,936 (the “‘936 Application”).

The differences between Claim 1 in the present application and Claim 1 of the ‘936 Application are not obvious. Each claimed invention is different in kind and is, therefore, patentably distinct. Claim 1 of the ‘936 Application recites “at least one radiation emitter coupled to the body to irradiate with phototherapeutic radiation a portion of the oral cavity other than tissue in contact with the bristles.” These two Applications are directed to two independent inventions. As noted above, the present Application claims a device capable of emitting radiation in multiple directions to, e.g., selectively direct optical radiation delivered from an oral

appliance to different regions of the oral cavity depending on the desired treatment regimen. (See '686 Application ¶ 080.) On the other hand, the '936 Application as filed claims a device capable of emitting radiation in a direction that is other than the direction of the bristles but that is not required to be in multiple directions, to, e.g., emit radiation in a direction other than towards the hard tissue of teeth to treat other tissues in the oral cavity while the bristles are in contact with the teeth. (See '936 Application ¶ 081.) Dependent claims 2, 5-10 and 12-34 of the '936 Application do not render Claim 1 in the present application obvious, because those claims also include the patentably distinct limitations of Claim 1 of the '936 Application.

Claims 2, 4-7, 9-30 and 36-40 of the present Application are patentably distinct for the same reasons that Claim 1 is patentably distinct.

Claim Rejections - 35 U.S.C. § 112

Claims 6, 7, 9, 12, 14 and 20 stand rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as the invention. Applicants have amended Claims 6, 7, 9, 12, 14 and 20 accordingly.

Claim Rejections - 35 U.S.C. § 102

Claims 1-9, 29, 31-33, 35-36 and 40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by WO 98/06456 to Chen et al. (herein "Chen"). These claims are novel, however, because Chen fails to disclose all of the elements recited in the claims. For example, Claim 1 recites "*a first radiation emitting element coupled to the body to selectively irradiate a plurality of regions of the oral cavity with phototherapeutic radiation along multiple predetermined directions.*" Applicants disclose various devices that are capable of irradiating the tissue in multiple directions using a single emitter or group of emitters. (See Application ¶¶ 82-85.) For example, Applicants disclose several embodiments that selectively direct phototherapeutic radiation in multiple directions from a single emitter or group of emitters.

For example, FIG. 19 shows body portion 26 positioned between the teeth and cheek tissue. In this embodiment, optical energy is selectively directed toward cheek (wall of the oral cavity), gum, and tooth tissue. In yet a further embodiment, optical radiation from the light emitting mouthpiece can be directed

toward the soft tissue beneath the tongue as shown in FIG. 20, or other parts of oral cavity to support, e.g., oral drug or vitamin delivery.

(Application ¶ 84.) Thus, the Applicants disclose embodiments that, among other things, are capable of simultaneously irradiating multiple tissues in predetermined directions as shown in FIGS. 19 or sequentially irradiating multiple locations of the same tissue by altering the direction of the emitted radiation using a rotatable mirror as described in Paragraph 85.

In comparison, Chen does not disclose at least one radiation emitting element coupled to the body to selectively irradiate a plurality of regions of the oral cavity with phototherapeutic radiation along multiple predetermined directions. Instead, Chen discloses irradiating tissue in the direction of the gum line. Chen discloses a mouthpiece that fits over a patient's teeth to irradiate the gum line. (See, e.g., Chen 3:12.) Chen discloses that "light is delivered to a treatment site extending along the gum line in a patient's mouth." (Chen. 5:3-4.) The embodiments of Chen are devices that "treat disease in an oral cavity" and do so by treating the gum line in the oral cavity. (See, e.g., Chen 3:34, 5:13, 6:8-12 and 28-34, 7:11-22, and 8:7-16 and 18-20.) To achieve this, Chen specifically discloses and teaches the use of a reflective material to direct radiation to the gum line. (Chen page 7:34 to 8:1.)

Furthermore, Chen discloses irradiating a photoreactive agent that is applied to the tissue along the gum line. Therefore, Chen effectively does not disclose applying phototherapeutic radiation to tissue other than along the gum line.

Claims 2-9, 29, 31-33, 35-36 and 40 are novel for at least the same reasons that Claim 1 is novel. Accordingly Claims 1-9, 29, 31-33, 35-36 and 40 are novel and patentable over Chen.

Claims 1, 10-19, 23 and 36-37 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,862,771 to Muller (herein "Muller"). These claims are novel, however, because Muller fails to teach or suggest the elements recited in the amended claims.

As noted by the Examiner at page 6 of the Office Action, Muller discloses a device in which "the radiation is directed in a direction parallel to the bristles either between the bristles or through the optically transparent bristles." As such, Muller does not teach at least one radiation

emitting element capable of selectively irradiating a portion of the oral cavity with phototherapeutic radiation along multiple directions as recited in Claim 1. To supply this element, the Examiner states that the bristles may emit radiation in multiple directions, because the bristles may be deflected. However, this does not constitute selectively irradiating tissue in multiple directions. Any deflection by the bristles would be a result of happenstance and the tissue would not be selectively irradiated in multiple directions.

With respect to Claims 15 and 16, Muller does not inherently disclose the elements of those claims, i.e., bristles shaped to transmit radiation upon contact with tissue and a particular type of bristle, as stated in the Office Action at 6. Muller does not disclose the various techniques taught by the Applicants. For example, at Paragraph 093, the Applicants disclose:

In some embodiments of the invention, the bristles are shaped so as to allow controlled leakage of radiation at selected points. For example, FIG. 24 illustrates another embodiment of bristle 14 in the form of an optical loop. Both ends of the loop are connected to an optical radiation source 18. Light is generally contained within the loop except for at the bend where the disturbed complete or almost complete internal reflection effect allows light leakage. The bend can be positioned in a target tissue area to deliver optical radiation. Such bristles also enhance eye safety characteristics of the device because they can ensure that light is emitted only at selection portions, e.g., portions in contact with oral cavity tissue.

Muller does not require or teach these or other techniques, including the use of total internal reflection to prevent the emission of radiation from the bristles when the bristles are not in contact with tissue.

With respect to Claim 19, the Examiner references an embodiment of Muller in which light is emitted from the head of the device parallel to the bristles. Muller discloses bristles that are “fixed” “welded” or “anchored” to the head of the device. Thus, even if the distal ends of the bristles in FIG. 6 of Muller, as cited by the Examiner at page 6 of the Office Action, were deflected during use, the radiation would still be emitted in a direction parallel to the bristles, because the anchored proximal ends would continue to be in the same relative position parallel to the emitted radiation.

Claims 10-19, 23 and 36-37 are novel for at least the same reasons that Claim 1 is novel. Accordingly Claims 1, 10-19, 23 and 36-37 are novel and patentable over Muller.

Claims 1, 2, 4, 5, 7-9, 19, 36 and 38 are rejected under 35 U.S.C. §102(b) as being anticipated by PCT Application Number WO 95/10243 to Mendes et al. (herein "Mendes"). These claims are novel, however, because Mendez fails to teach or suggest the elements recited in the amended claims.

Specifically, Mendes fails to teach or suggest at least one radiation emitting element coupled to the body to irradiate along multiple directions, as required in Claim 1. As noted in Mendez, with reference to FIG. 1, the LEDs 110 that are used to emit radiation are not configured to irradiate tissue in multiple directions. Each individual LED is configured to irradiate tissue in one direction. To irradiate tissue in a second direction, a second bank of LEDs 110, which lies, e.g., in FIGS 1 and 2, on the opposite side of the bristles, is used. (Mendes page 6:16-35.)

Claims 2, 4, 5, 7-9, 19, 36 and 38, which are dependent on Claim 1, are novel for at least the same reasons that Claim 1 is novel. Accordingly Claims 1, 2, 4, 5, 7-9, 19, 36 and 38 are novel and patentable over Chen.

Claim Rejections - 35 U.S.C. § 103

Claim 20

Claim 20 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,862,771 to Muller (herein "Muller") in view of U.S. Patent 6,273,884 to Altshuler et al. (herein "Altshuler").

Claim 20 is not obvious, because there is no motivation to combine Muller and Altshuler. Muller does not disclose a need or benefit from controlling the emission of radiation when a bristle is not in contact with tissue of the oral cavity. Instead, Muller discloses a means to irradiate deposits on teeth and detect them from their fluorescence. Muller, therefore, discloses the use of total internal reflection, e.g., in the head of the device to ensure that radiation is

directed in the proper direction, but there is no teaching of a benefit to restraining the emission of that radiation once it has been properly directed at the tooth. As such, there is no motivation to combine Muller with Altshuler's teachings regarding using internal reflection to prevent the emission of radiation when a device is not in contact with the tissue being irradiated.

Claim 21

Claim 21 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Muller further in view of U.S. Patent Number 6,029,303 to Dewan (herein Dewan). The claim, however, is patentable because there is no suggestion or motivation by either reference to combine the references to obtain "a motion sensor and controller which controls the radiation emitter based on signals from the motion sensor" as claimed. Dewan discloses installing a motion detector for a very different purpose, i.e., as an alert to ensure, for example, sufficiently long brushing by children or the disposal of a toothbrush kept too long. (Dewan Col. 1 40-54.) Dewan does not disclose the use of a motion sensor in conjunction with a control system for controlling a radiation emitter to treat the oral cavity. Given the distinct purpose and nature of the motion sensor in Dewan, it would not be obvious to combine Dewan and Muller.

Claim 22

Claim 22 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,862,771 to Muller (herein "Muller") in view of U.S. Patent No. 5,133,102 to Sakuma (herein "Sakuma"). The claim, however, is patentable, because even when combined Muller and Sakuma do not provide all of the elements of the claims.

As discussed above, Muller does not disclose all of the elements of independent Claim 1. Muller, the primary reference, is directed to a toothbrush head suitable to direct incident radiation toward a surface of a tooth and to collect emitted fluorescence from the surface of the tooth. (See Muller, Abstract.) Sakuma does not supply the teachings that are missing from the claims.

Additionally, Sakuma does not teach "a contact sensor and controller which controls the radiation emitter based on signals from the contact sensor" as recited in Claim 22. Sakuma

teaches a simple circuit that is closed by the gripping of the handle of the toothbrush and the touching of the bristles to the teeth. The complete circuit causes "a current which passes through the user's hand and body flows into the surface of the teeth via the dental pulp tissue and tooth tissue proper." (See Sakuma Col. 4, lines 4-9.) The flow of electric current causes the protein organic ions of plaque on the surfaces of the teeth to become affixed to the toothbrush." (See Sakuma Col. 4, lines 4-9.) The mechanism in Sakuma is not a contact sensor that supplies signals to a controller that controls the emitter. Sakuma does not emit radiation onto the teeth and, thus, does not include a controller that controls the emitter. Instead, the LED of Sakuma is an alarm to alert the user "that the toothbrush is operating." (See Sakuma, Abstract.)

Claims 24, 26, 28 and 37

Claims 24, 26, 28 and 37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Muller in view of U.S. Patent No. 4,333,197 to Kuris (herein "Kuris"). The claims, however, are patentable, because there is no suggestion or motivation to modify the toothbrush head of Muller with the ultrasonic toothbrush of Kuris. Further, even when combined, Muller and Kuris do not disclose all of the required elements of the claims.

Muller, as discussed above, does not teach all of the elements of Claim 1. Further, Muller does not teach or disclose the removal of heat or the control of temperature from his device. The Examiner states at page 9 of the Office Action that heat transfer in the device in Muller is inherent because virtually all materials have some heat transfer capacity. However, not all materials are suitable for such a purpose, because not all materials have a sufficient thermal conductivity, even though they may have some nominal ability to conduct heat. It is commonly known that the ability to transfer heat in many materials is so low that they are considered to be insulators and not capable of transmitting heat. On the other hand, the Applicants specifically disclose an embodiment with structures having sufficient thermal conductivity to remove heat during operation. For example, in paragraph 074, the Applicants state:

An LED, a laser diode, or a microlamp can generate heat energy that is up to 20 times higher than the generated optical energy. To accommodate unwanted waste heat, the light emitting oral appliance can include heat transfer and/or cooling mechanisms. For example, head portion 12 of the exemplary light emitting

toothbrush can be at least partially formed of a heat conducting material for dissipating heat generated by the radiation source. For example, with reference to FIG. 2B, the head portion 12 can include a head frame 38 that is constructed from a material having high thermal conductivity and/or good heat capacitance and is thermally coupled to the radiation source 18 to extract heat therefrom.

In contrast, Muller is silent both as to the need to remove waste heat and as to the thermal conductivity of the structures included in the device. The ability to remove heat, therefore, is not inherent in Muller.

Kuris does not disclose "at least one thermally conductive element for extracting heat from the emitter" as required by Claims 24, 26 and 28. Kuris does not disclose removing heat from the emitter of the device. Specifically, Kuris states at Col. 4, lines 23-33:

The components disclosed in the preferred embodiment herein are of the discrete type including a plurality of resistors, capacitors and transistors and are preferably mounted on a printed circuit assembly board 40 to the rear inside area 42 of display case 18, in a conventional manner. The side walls 38 and 44 may be made of metal such as aluminum, permitting the power drive transistor 50 to be mounted directly to the side wall 44, in a conventional manner, so that any heat dissipated therein may be readily radiated to the external atmosphere.

The electronic components to which Kuris refers are not contained in the ultrasonic toothbrush. Instead, the components are part of a display case, and not the ultrasonic toothbrush itself. The display case is designed to be mounted on a wall or placed on a table. Kuris teaches heat transfer from electrical components associated with the input power transformer 52 in the display case and not from either the transducer motor 60 or any ultrasound emitter located in Kuris' toothbrush. Thus, Kuris does not teach the heat transfer elements of claims 24, 26 and 28.

Similarly, Kuris does not teach the combination of an emitter with an ultrasound generator as required in claim 36. Kuris teaches only the use of ultrasonic energy for use in a toothbrush. Kuris does not teach the use of an emitter in combination with an ultrasound generator. There is no teaching or suggestion in either Muller or Kuris to combine these elements, or that such a combination would compliment the hygienic process as stated at page 9 of the Office Action. Therefore, absent some stated motivation to combine the references, the combination is not obvious.

Claims 25 and 27

Claims 25 and 27 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Muller further in view of U.S. Patent Number 4,333,197 to Kuris (herein "Kuris") and further in view of U.S. Patent Number 6,350,276 to Knowlton (herein "Knowlton"). The claims, however, are patentable because there is no suggestion or motivation by either reference to combine the device of Knowlton with the oral appliances of Muller and Kuris. In fact, Knowlton effectively teaches away from such an application by listing a host of potential applications that do not include treating tissues in the oral cavity. (Knowlton Col. 6:49-57.)

Furthermore, Knowlton uses radiation to reshape collagen-containing tissue, and the cooling mechanism provides a means to protect the collagen-containing tissue from thermal damage.

Fluid delivery device 13 is configured to deliver a heat transfer media 15 (also called a cooling media 15, flowable media 15 or fluid 15) to tissue interface 21, that serves to dissipate sufficient heat from the skin and underlying tissue at or near tissue interface 21 during the delivery of energy at or near this site so as to prevent or reduce thermal damage including burning and blistering. Similarly, fluid delivery device 13 may also deliver fluid 15 to and dissipate heat from energy delivery device 18 and/or template 12 to achieve a similar result.

(See, e.g., Knowlton Col. 5, lines 4-13.) There is no teaching from Muller or Kuris that suggests that the toothbrush devices of Muller or Kuris operate at sufficiently high power that either tissue may be thermally damaged, including burning and blistering by touching the device or as a result of radiation emitted from the device, or that cooling as in Knowlton is either required or beneficial. Thus, there is no motivation to combine the references.

Claims 30

Claim 30 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Muller in view of the knowledge of one skilled in the art. As discussed above, Muller does not disclose all elements of Claim 1 from which Claim 30 depends. Furthermore, there is no cited teaching that would make it obvious to apply that art in this context.

Claim 34

Claim 34 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Chen in view of the knowledge of one skilled in the art.

As discussed above, Chen does not disclose all elements of Claim 1 from which Claim 34 depends. Thus, even assuming that the variance of shape is obvious as a matter of law as stated in the Office Action at page 10, Claim 34 is not obvious, because the claimed elements are not disclosed in the cited combination.

Furthermore, the shape of the device, as recited in Claim 34, is related to the functioning of the device and is not a minor design consideration. Chen actually teaches away from the application of a mouthpiece shaped to irradiate tissues other than the teeth and gums, because each embodiment disclosed in Chen is designed to irradiate the gum line. Chen does not disclose a need for or benefit from irradiating in multiple directions to treat other tissues. Thus, it would not be obvious to adapt Chen's devices to irradiate other tissue by creating a device that covers at least a portion of the user's lips during phototherapy.

Claim 39

Claim 38 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Muller in further view of U.S. Patent Number 5,658,148 to Neuberger et al. (herein "Neuberger"). The claim, however, is patentable because there is no suggestion or motivation by either reference to provide a drug delivery port as claimed. The water or liquid passage disclosed in Neuberger is used for a different purpose, and there is no teaching or motivation to alter the device of Neuberger or to combine such an altered device with Muller to obtain a drug delivery port that operates using principles consistent with the disclosed operation of the device in Muller. In the specific text cited by the Examiner, Neuberger discloses a passage that delivers water or other liquid under pressure during operation. The purpose of the water or liquid is to facilitate the transfer of radiation, and not to deliver a drug. Neuberger discloses that, when liquid passes over fiber end 53 radiation will pass substantially radiation substantially parallel to the optical fibers due to the change in refractive index. (Neuberger Col. 4:12-25.)

Furthermore, Claims 20-22, 24-28, 30, 34, 37 and 39 are each patentable for at least the same reasons that Claim 1 is patentable.

CONCLUSION

In summary, the above-identified patent application has been amended and reconsideration is respectfully requested for all the reasons set forth above. In the event that the amendments and remarks are not deemed to overcome the grounds for rejection, the Examiner is kindly requested to telephone the undersigned representative to discuss any remaining issues.

Respectfully submitted,

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